EXPLANATION

PRINCIPAL AREA OF SATURATION IN SURFICIAL DEPOSITS-Saturated thickness generally is less than 5 feet; maximum saturation is about 10 feet

PRINCIPAL AREA OF GROUND-WATER-LEVEL FLUCTUATION--Level may fluctuate from the terrace deposits to the underlying

where approximately located. Contour interval 10 feet. National Geodetic Vertical Datum of 1929

FRACE OF GEOHYDROLOGIC SECTION--Shown in figure 11

in feet. National Geodetic Vertical Datum of 1929

TEST HOLE--Destroyed

Stream-gaging station and number

CONVERSION FACTORS AND VERTICAL DATUM

0.3048

0.1894

0.06309

1.609

Temperature in degrees Celsius (°C) can be

converted to degrees Fahrenheit (°F) as follows:

 $^{\circ}F = 9/5 (^{\circ}C) + 32$

Sea level: In this report, "sea level" refers

to the National Geodetic Vertical Datum of

1929 -- a geodetic datum derived from a general

adjustment of the first-order level nets of the

United States and Canada, formerly called Sea

0.04381

second (ft /s)

gallon per minute

per day (Mgal/d)

Level Datum of 1929.

foot (ft)

(ft/mi)

mile (mi)

(gal/min)

million gallons

foot per mile

To obtain

square meter

cubic meter

per second

meter per

liter per

second

kilometer

cubic meter

per second

kilometer

meter

WELLS--Number above the bar, where shown, is depth to water, in feet below land surface. Top number below the bar, where shown, is altitude of water surface, in feet; - indicates data not available. Lower number below the bar is altitude of the bottom of the well,

Water level in well used for control in drawing potentiometric contours. Well is completed in surficial deposits or upper part of Ogallala Formation. Well depth is less than 175 feet Water level in well not used for control in drawing potentiometric contours. Well is completed in Ogallala Formation or White River group. Well is completed at depth of more than 175 feet or in shallow, perched zone above contoured potentiometric

OTHER DATA SITES--Number near symbol is altitude of spring, seep, or

water level in pond, pit, or excavation. National Geodetic Vertical Datum

EFFECTS OF URBAN DEVELOPMENT

The High Plains aquifer system has been modified locally by urban development. That part of the system in the shallow zones is affected by excavations and by some structures that penetrate saturated zones. Deeper zones are less affected. During grading and leveling, all or nearly all surficial deposits and the uppermost part of the Ogallala Formation are reworked and re-deposited as fill. Residential housing and other structures commonly are built on fill that has increased permeability and increased thickness compared to the original deposits. Uncompacted fill presents the following potential seepage-related problems: (1) Water in excavations, such as basements, crawlways, and trenches for pipelines; and (2) local subsidence involving structures. particularly of paved streets and commercial buildings.

All channels and floodplains in the urban area have been modified, some extensively, by urban construction (fig. 12), and some have been obliterated. The channels of Crow and Dry by constructed controls in most of the urban area. The lower reach of Clear Creek and reaches of many of the small tributaries of Crow and Dry Creeks have been diverted into drainage ditches; however, the flow of many small tributaries is along paved streets. The few storm sewers constructed in Cheyenne were built prior to 1941. In many residential areas developed since about 1945, the channels of tributary drainages and associated floodplains are buried beneath fill. Small channels have been constructed throughout the urban area to change the surface drainage locally. Flood-detention reservoirs have been built along Dry Creek and Henderson drain, but reservoirs are not present along Crow Creek in the Cheyenne area upstream from Wyoming Hereford Ranch Reservoir No. 1. Part of the flood flows that previously would have flowed southward to Crow Creek have been diverted eastward by railroad embankments, as indicated by the 1985 flood (Druse and others,

Pulses of local recharge in central Cheyenne, including the business area north of Crow Creek, can cause fluctuations of the ground-water level which is within a few feet of the land surface. Because of the clayey and silty character of the Ogallala Formation, only a small volume of water would be necessary to raise the ground-water level and saturate the surficial deposits. Any fluctuation of the water level might have detrimental effects on structures, such as seepage into basements or possibly subsidence due to compaction of unconsolidated fill. The use of sump pumps in basements of large buildings in central Cheyenne has lowered the water table near the buildings.

Sealing basements in large structures to prevent seepage might form barriers to the movement of ground water. This might result in the water table rising upgradient from the structures, which can cause seepage problems in some pre-existing buildings.

Many of the gravel pits used before 1941 have been filled or partly filled with a heterogeneous assortment of stone and organic debris that locally affects the movement of water, and, perhaps, also affects the chemical quality of the water. Drainage conduits underlying the Cheyenne Municipal Airport, as reported by airport personnel, intercept some shallow ground

Near Cheyenne, the High Plains aquifer is considered an aquifer system because the system consists of several distinctive water-bearing units that are in the Ogallala Formation and overlying surficial deposits. Contrasting with nearby regions where the Ogallala Formation is mainly of sandstone, the Ogallala near Cheyenne consists of thin sandstone and conglomerate beds enclosed in clay and silt sequences. These lithologies affect the distribution and movement of water in the upper part of the aquifer system. The principal surficial deposits are alluvial and terrace deposits that extend over much of the metropolitan area. Much of the water in the upper part of the aquifer system generally moves at shallow depths toward and discharges principally to Crow and Dry Creeks. Water at shallow depths occurs throughout much of the city and has caused problems such as seepage into basements and along footings for buildings. Distribution of the shallow water is shown by a potentiometric-surface map. Locally, perched water occurs above the level of the mapped potentiometric surface. Water in the upper part of the aquifer system generally is unconfined or under water-table conditions, whereas water in the lower part of the aquifer system is confined by extensive clay and silt beds of the Ogallala Formation and is under artesian conditions. In places, a few wells

flow at the land surface.

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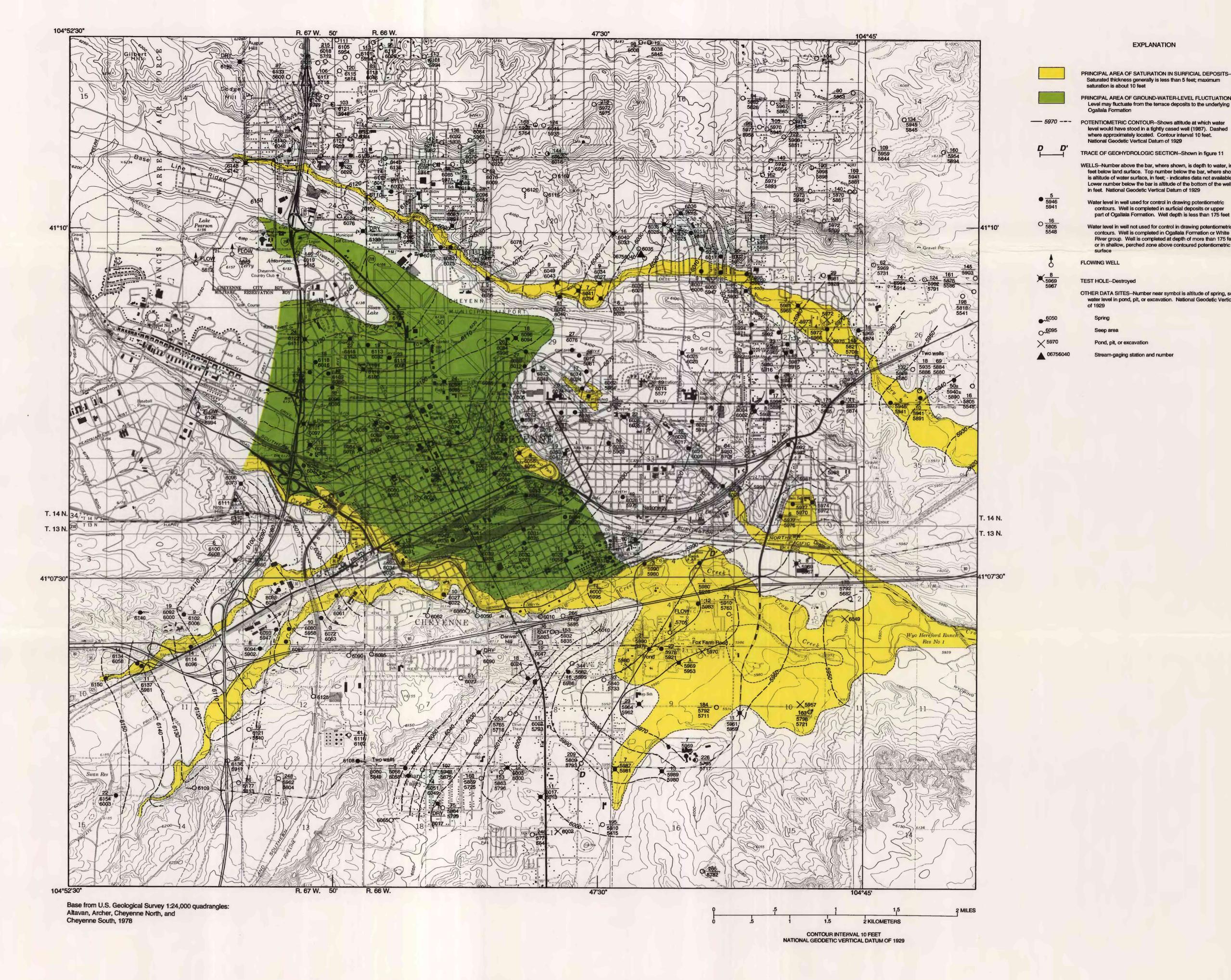
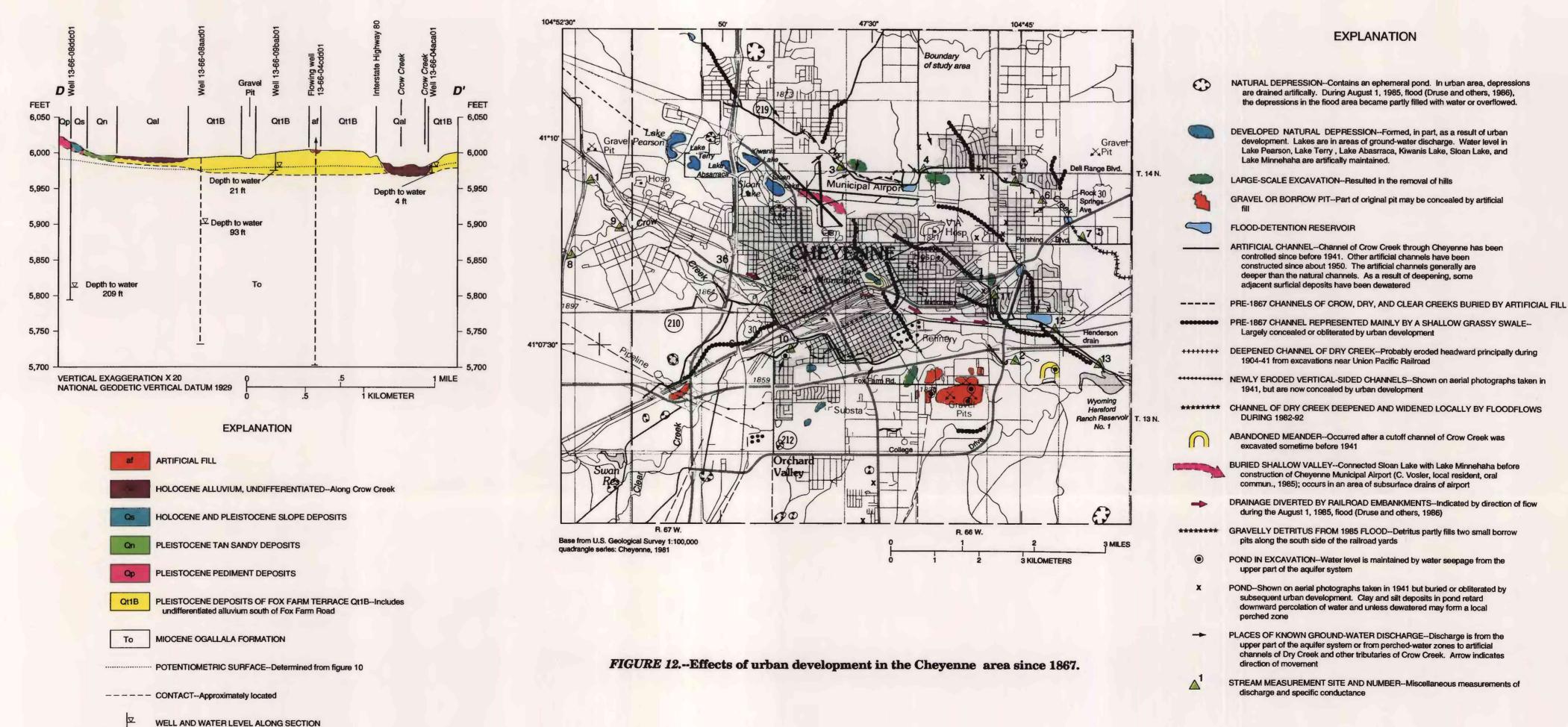


FIGURE 10.-Potentiometric-surface map of the upper part of the High Plains aquifer system.



WELL AND WATER LEVEL PROJECTED TO SECTION

potentiometric surface in the upper part of the High Plains

aquifer system and water levels in wells completed

FIGURE 11.--Geohydrologic section near Fox Farm Road showing the

in the lower part of the aquifer system.